

## **SOCIAL INDICATORS AND MEASUREMENTS OF VULNERABILITY FOR GULF COAST FISHING COMMUNITIES**

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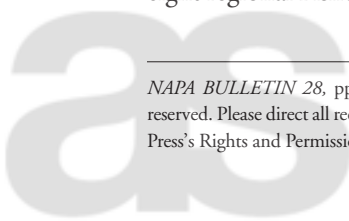
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*Social indicators as measures of economic or social well-being have existed since the early 1970s. It is only recently that the use of social indicators have become of some utility to fisheries management. Prior to the revision of the Magnuson-Stevens Act and the addition of National Standard 8, there were only a handful of studies that collected the types of data that could be used to create such indices. However, with the addition of a provision to define and identify fishing communities in the Act (National Standard 8), the ongoing collection of census and other statistical data on fishing communities has been instituted. This article describes the creation of a "vulnerability index" consisting of measures of employment opportunity and community well-being from census and other data sources that was used as part of the social impact discussion. The index provides an indication of which fishing communities might be affected the most by the choice of several management alternatives included in a recent Environmental Impact Statement for the Essential Fish Habitat Amendment for the Gulf of Mexico Fishery Management Council. This article concludes with a discussion of the need for improved data and methods to assist fishery managers with social impacts and the personnel to write and review such assessments, as fishing communities in the Gulf of Mexico are rapidly changing. Keywords: fishing community, social impact, social indicators, vulnerability, fisheries management*

Social impact assessment arose in the early 1970's in response to environmental legislation and has continued to develop into what William Freudenberg (1986) describes as a hybrid of the social science field and a component of policymaking. Yet while the field has continued to mature, the question originally posed by Freudenberg (1986), as to how to incorporate science into a largely political process still remains, at least within fishery management. The legal mandates for social impact assessment have existed since the inception of the National Environmental Policy Act (42 U.S.C. § 4321 et seq.) in 1969 (NEPA) and the Magnuson Act (16 U.S.C. §1801 et seq.) in 1976, which established the eight regional Fishery Management Councils to manage the Nation's fisheries within the

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200-mile Exclusive Economic Zone (EEZ). More recently in 1996, with the reauthorization of the Magnuson-Stevens Act (MSFMA) additional mandates were added; the most noteworthy being National Standard 8 (NS8), which requires the identification of fishing communities and an assessment of their dependence on fishing. These and other regulatory directives have guided the National Marine Fisheries Service (NMFS) and regional Councils in conducting their social impact assessments over the past several decades.

It has been only recently, however, with a new research agenda and the focus on fishing communities that the collection of baseline data for comparison over time and across fisheries has been initiated through funding from the NMFS. Although there have been many social impact assessments written for regional fishery management agencies, (e.g., Impact Assessment, Inc. 1991; McCay et al. 2002; Wilson and McCay 1998) the focus for many of these efforts is often a specific fishery or management action making it difficult to monitor trends over a wide geographic area or update data to assess impacts in a timely fashion. Funding is often on a one-time basis and does not provide for future data collection. Add to that, the councils and the NMFS are continually implementing new regulations, often according to strict timetables that do not allow for collection of new data, especially if it requires lengthy fieldwork. The limited time frame and lack of data make it difficult for Council or NMFS staffs to assess the impacts of alternatives which can often be numerous, since as many options as possible are included to meet national standards for management of the nation's fisheries.

To meet recent mandates in the reauthorization of MSFMA, the NMFS over the past several years has made funding available to identify fishing communities in all management regions. Unfortunately, these are initial attempts to profile communities and questions remain as to how to measure dependence on fishing or a determination as to which communities can be considered "fishing" communities. Guidelines have been developed but are not final limiting the capability to designate any community as a fishing community or determine its dependence on fishing. There have been few investigations into the complex links between fishing, its support industries, and the larger social and economic community. The lack of such research severely limits the capacity to draw conclusions about the true nature of social impacts resulting from management actions and restricts the ability to build any type of theoretical foundation. Indeed, much of the research to date has raised serious questions as to what constitutes a community itself, no less a fishing community.

Although social scientists have been hired in science centers and regional headquarters to oversee this new research agenda and fulfill obligations set out in regulatory mandates to conduct and review social impact assessments, especially with regard to fishing communities, the Southeast has lagged behind in their hiring of adequate staff to conduct social impact assessment and oversee research that includes three fishery management councils. The Gulf of Mexico Fishery Management Council (GMFMC) had not benefited from NS8 funding nor had they identified fishing communities under their management purview in any systematic fashion. Additionally, the council had no social scientist (noneconomist) on staff. Although the Southeast Regional Office of the National Marine

Fisheries Service (SERO) had advertised a position, they too were without a permanent social scientist. Other council staff or NMFS economists wrote most social impact assessments, included in plan amendments. Some assessments were limited to short term funding for specific management regimes and were conducted by outside contractors.

Early in 2002, the GMFMC contracted with the Marine Resource Assessment Group (MRAG) of Tampa, Florida to develop a generic Essential Fish Habitat Amendment (EFH) and Environmental Impact Statement (EIS) (GMFMC 2004). The amendment would describe all essential habitat within the council's jurisdiction, but it would also include areas that were important nursery habitat for species managed by the Council. An EIS is required under several mandates but is essentially necessary when the actions may have a significant impact on the human environment or ecology or when there may be some controversy. An EIS must include a description of the fishery or fisheries and the affected environment; therefore, the EIS often encompasses a rather extensive profile of the fishery.

The MRAG subcontracted several components of the amendment and EIS to scientists and consultants throughout the region. One of those subcontracts was to identify fishing communities within the GMFMC jurisdiction and conduct the social impact assessment for the amendment (GMFMC 2004), which is the basis for this article. Given the rather narrow timetable, data collection needed to be limited to secondary data that could be collected through various governmental agencies including, NMFS, the Census Bureau and the Bureau of Economic Analysis. Because the majority of time and effort would be spent developing community profiles, an assessment tool produced within the time constraints of plan development was considered necessary. Additionally, a vulnerability index utilizing social indicators from census and other data for fishing communities was considered realistic.

The idea of vulnerability within fishing communities is not new and had been explored qualitatively in the Mid-Atlantic (McCay and Cieri 2000) and Northeast (Hall-Arber et al. 2001). A loss of fishing infrastructure and the increasing "gentrification" within coastal communities of both areas was making it difficult for commercial fishers to remain in their traditional place as waterfront property values increased. This was evident in research to identify fishing communities in Florida (Jacob et al. 2002) and had been earlier recognized as a problem along the entire U.S. coast (Gale 1991), making these communities highly susceptible to adverse impacts from fishery management regulation.

The fact that these communities are undergoing rapid change is confirmation of the need to understand the implications for management. Unfortunately, it is the lack of reliable analytical tools for rapid appraisal that plagues many council and NMFS staff. This is in part because of the scarcity of available data, time involved, and workload for the small group of people who are charged with conducting such analyses. Because Fishery Management Plan (FMP) development, once initiated, is tied to established timetables, there is little or no time for in-depth analysis or major data collection. Furthermore, there are too few social scientists in many regional offices or on council staff and they are typically responsible for social impact assessment on all FMPs, whereas



Figure 1. Cognitive Mapping with Fisherman from St. Thomas, U.S. Virgin Islands. Photo by Michael Jepson.

biologists and economists are sometimes compartmentalized and do their analysis on a limited number of species or user groups. With many other duties and responsibilities it all adds to shortened timetables for conducting analysis on plan amendments.

At present, time and monetary constraints have dictated the use of rapid appraisal methods and the collection of secondary data sources which limit the tools for assessment. Social scientists within fishery management agencies need to be able to quickly assemble existing data into tools to assist with their analyses. It is with that in mind that we explore the use of social indicators and the development of various indices that will assist in social impact analysis until funding for more comprehensive analysis becomes available. Given the time and expense involved in the more extensive ethnographic research that many have deemed necessary to fully understand the interconnectedness of the fishing economy and community, it is unlikely there will be significant progress in terms of community definitions or dependence in the near future as funding for NS8 has been significantly reduced. Furthermore, while economists continue to be hired in many regions and councils, hiring of noneconomist social scientist positions has stalled and social impact assessment is often written by other staff when not contracted out. In the meantime, as fishing communities continue to experience rapid transformations, it is imperative that some meaningful measures be available to those who are in positions to describe the social impacts of fishery management.

## **FISHING COMMUNITIES IN THE U.S. GULF OF MEXICO**

The U.S. Gulf of Mexico is home to a variety of small scale fisheries but can claim one of the most valuable in the entire nation with the Gulf shrimp fishery. The potential fishing communities chosen for the EIS were selected, in part, because of their recognition

in previous research (Holland et al. 1999; Jacob et al. 2002; Lucas n.d.; Maril 1983, 1995; Sutton et al. 1999) as being important ports for various types of fishing including commercial, charter, and recreational fishing. The most common types of commercial fishing in the region are shrimp trawl fishing, bottom long line and bandit reel fishing for reef fish, various types of net fishing for pelagic finfish, and trap fishing for stone crab and spiny lobster. Both charter and recreational fishing are ubiquitous within the coastal communities along the gulf and communities involved in all three sectors are spread throughout the Gulf of Mexico from Key West, Florida, to Brownsville, Texas, each having its own unique blend of fishing sectors and infrastructure.

The most recent census data were collected from the U.S. Census Bureau's website and combined with census data from the past three decennial censuses. The historic census data had been collected for coastal communities in the South Atlantic and gulf under a previous grant for a number of standard socioeconomic variables. The combined data provided a time comparison from 1970 to 2000 for variables such as: population, age structures, racial and ethnic composition, income distributions, occupation, industry, and residential mobility.

There were 66 community profiles assembled with the census data and various permit data for vessels and dealers for the five states in the Gulf coast region. The list of fishing communities was revised and one community was added after a review by a technical committee composed of Council advisory panel members who were familiar with many of the managed fisheries for a total of 67 communities.

## **A VULNERABILITY INDEX**

One factor that was considered to be important while taking into account impending regulation was the availability of employment within these communities. Commercial fishers often engage in other types of work if fishing is slow or they face closed seasons. In fact, most commercial fishers have employment histories that include extended work outside of fishing, although they prefer fishing to most any other type of job. Previous research had suggested that employment opportunities were not confined to the local community but often encompass a more regional area (Hall Arber et al. 2001; Jacob et al. 2002). With that in mind and using previous indices as a guide, an index of vulnerability was created for each community that would include two components: an assessment of employment opportunities and an indication of community well-being.

The constituent variables included measures of employment growth through the three components of a shift share analysis, the poverty rate, and average wage or salary for a community. These were compared to the same variable for the county in which the communities were located, thereby providing some indication of community well-being in contrast to the larger regional economy. The shift share analysis was conducted at the county level and covered a two decade period from 1980 to 2000. If the community showed growth in the same economic sector identified through the shift-share

**TABLE 1** Vulnerability Scale Components and Scores

SCALE COMPONENT	SCALE SCORE	CRITERIA
Shift share component		
National growth component	1	National growth component is increasing like county
	0	National growth component are the same like county
	-1	National growth component is decreasing like county
Industrial mix	1	Industrial mix contributes positive employment growth
	-1	Industrial mix contributes negative employment growth
Competitive share	1	Competitive share indicates positive employment growth
	-1	Competitive share indicates negative employment growth
Poverty component	1	Poverty below county level
	0	Poverty same as county level
	-1	Poverty above county level
Average wage/salary component	1	Average wage/salary above county level
	0	Average wage/salary same as county level
	-1	Average wage/salary below county level

*Note:* The five item scale was tested for internal consistency with Chronbach’s alpha = .60.

analysis for the county over the two-decade period, then the index score was positive. Each component of the index was given one of three values 1, 0, -1. If the county’s industrial mix and competitive shares were positive, then the community also received a positive score (See Table 1). The same type of analysis was performed for the measures of well-being and a community received a similar value if the percentage of individuals living under the poverty level was either below, the same or above the county and if the average wage was above, the same or below. A community index score was the cumulative total of values derived from employment opportunities, poverty and average wage components (see Table 1).

Each community had a range of possible scores from: not at all vulnerable with a positive 5, to very vulnerable with a -5. The range of scores covered the entire scope of possible scores. To aid interpretation, the scale was collapsed into three possible aggregate scores: (1) not vulnerable (Index scores from 5 to 3); (2) somewhat vulnerable (Index scores from 2 to -1); and (3) very vulnerable (Index scores from -2 to -5). With the completed analysis there were a total of 22 communities considered “not vulnerable,” 32 “somewhat vulnerable,” and 13 scored as “very vulnerable.” With Chronbach’s alpha of .60 the scale does indicate some reliability but would likely benefit from additional items.

A table of all communities and their vulnerability score by state was included within the human environment section of the EIS. To further assist in the analysis, tables were provided which listed those communities with 10 or more permits by species and ranked according to their vulnerability as measured by the collapsed index. This would allow the council to judge the impact of alternatives by the affected fishery and identify

those communities that were most vulnerable.<sup>1</sup> The EIS was reviewed by the council's scientific and statistical committee and the vulnerability index received favorable comments from several committee members. When the full council reviewed the document each state representative provided comments on those communities identified within their jurisdiction. While most agreed with the analysis and community designations, the Alabama representatives considered the designation of one community as not vulnerable to be inaccurate and offered a motion that the scale score for that particular community be a -3. The motion passed with no other community designations being contested.

To visualize the distribution of vulnerable communities, the data were placed into a geographical information System of U.S. Gulf states.<sup>2</sup> Those communities that are most vulnerable (depicted by the dark circle) tend to be located along the northern and western gulf (see Figure 2). Florida, which relies heavily on recreational tourism and has more beachfront than the other states, has no communities rated as very vulnerable. Whereas Louisiana and Texas, which have a larger portion of their coastal economies dependent on oil and gas, have the majority of vulnerable communities. While tourism and fishing communities seem to be antithetical, gulf coast fishing communities have had to contend with tourism for most of their history. However, it is within those areas that are seeing rapid population growth that tourism seems to be having the most deleterious effects in terms of competition for waterfront property.

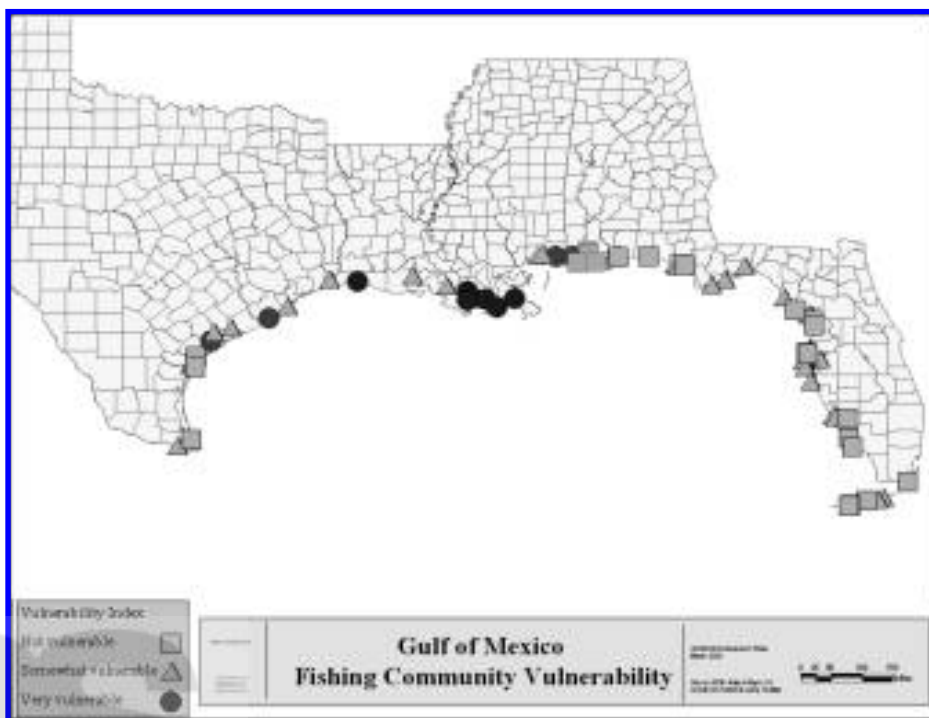


Figure 2. Vulnerable Fishing Communities along U.S. Gulf Coast, 2002.



## DISCUSSION

Utilizing social indicators to form analytical tools for impact assessment is just one of many avenues available for the policy analyst. The vulnerability scale presented here is a rather straightforward compilation of available data. The measure was weighted toward a general employment variable and might benefit from an employment measure that is more specific to the occupations commercial fishers would likely seek if desired. While in many cases the primary employment growth was evident in the service sector for several counties, fishers are more likely to be found seeking alternative employment in construction or other trade-oriented sectors. However, fishers' wives are often employed in the service sector and their contribution to the household income can be an important factor in their husband's ability to continue fishing during times of financial strain (Smith et al. 2000). Measures of income from the census have been noted as being unreliable and can distort actual income distributions and therefore may not be an ideal choice. Nevertheless, working in an environment of fast approaching deadlines and limited data, the need for measures that can quickly be assembled is understandable.

A similar analysis was included in the Gulf Council's Shrimp Amendment 13 compiled by NMFS staff. A resiliency measure was created that compared communities classified as primarily involved in the fishing industry with national averages for several demographic variables from the census. Communities were considered less resilient if they included a national higher-than-average percentage of minorities and poverty rate, a lower-than-average education level as measured by percent with high school diplomas and percent with bachelors degree or higher, and a lower-than-average wage and salary. The index was collapsed into three categories for those communities which seemed "relatively vulnerable to economic and social impacts as a result of adverse management changes." Those categories were (1) communities which reflect all five of the attributes, (2) communities that indicate at least four of the attributes, and (3) communities that exhibit at least three of the attributes (GMFMC 2005). Although the terms *resilient* and *vulnerable* are used almost interchangeably in the amendment, they should be viewed as two different measures of a community's well-being. While vulnerability is a measure of exposure and susceptibility, resilience is a measure of hardiness and flexibility. In one sense, they may be on opposite ends of a scale of community well-being yet depend entirely on how each measure is formulated. A measure that incorporates both resilience and vulnerability would provide an improved perception of community well-being.

While funding for NS8 research has been available in all regions, considerable research and data needs are still lacking. Early rapid appraisal to identify fishing communities in the Gulf of Mexico has revealed that important linkages among the community, the fishing industry, and larger economy need further research. Additionally, fishing communities, like fish stocks they depend on, need regular assessment as they are often changing rapidly in response to factors unrelated to fisheries management. Growing coastal populations, increased dependence on tourism and recreational economies, gentrification, and degraded ecosystems have all been noted as having important impacts. Unfortunately, the need for more in-depth and more expansive ethnographic research



often loses as tighter budgets have reduced funding for community research. In the immediate future it seems unlikely that there will be expansion of research on fishing communities; therefore, reliance on current data and available analytical tools will continue to be necessary.

## CONCLUSION

While the initial research to identify fishing communities in the Gulf of Mexico has begun, there remain important issues related to dependence on fishing that need defining. The example provided here is an attempt to encourage others to begin developing measures of vulnerability, resilience, or dependence that can be quickly assembled and utilized for social impact assessment but are more rigorous and can be applied across regions. With the long history of social indicators and the development of measures of well-being, there exist numerous examples of indices from which to choose but these examples would need to be tailored to fishing community well-being. Continued research that builds on the development of robust measures of well-being for utilization in fisheries management can only benefit management personnel working in an environment of accelerated plan development and decreasing opportunities for expanded research.

Finally, there are important implications for the lack of analytical tools in social-impact analysis for fisheries management, related to both policy and theory. First, without rigorous analytical tools to apply to social impact analysis, many agency and council personnel find themselves unable to conduct adequate social impacts assessments. Much of the analysis is relegated to a qualitative discussion of what might happen given a particular regulatory regime. This pales in comparison to the often detailed stock assessments that are provided for a particular fishery. Using both fisheries dependent and non-fisheries dependent through annually funded programs, data collection for stock assessments has provided the basis for technical and rigorous scientific analysis of many species. So much so that many stock assessments provide point estimates of stock status that are then used to determine allocations to various sectors. In comparison, social impact assessments in most fishery management plans rarely predict any impacts with such specificity. This is not to say that social impact assessment should be limited to such measures as vulnerability or point estimates of economic or social change. Indeed, there is a great need for more in-depth ethnographic research and examination of the complex nature of fishing communities. However, the addition of such measures can strengthen the analysis and reinforce the qualitative discussion. This is especially true as agency economists begin to develop bioeconomic models to assess the impacts of alternatives within fishery management plans. This will only be accomplished if fishery management agencies continue to make progress in upgrading their data collection effort and maintain that effort on a continuous basis while also providing funding and adequate staff to administer such a research agenda. However, as mentioned previously, it is unlikely that in the forthcoming days of budget cuts and continuing resolutions that the social sciences



Figure 3. Fieldwork near Cruz Bay, St. John, U.S. Virgin Islands. Photo by Palma Ingles.

will fare well in competition for grant monies against the well-established natural science needs within the agencies.

This dire prediction is particularly important with respect to fishing communities as much of the evidence suggests that these communities are experiencing rapid change, not only from regulatory agencies, but other factors outside the realm of fishery management. Coastal development and rapid population increases have fueled the process of “coastal gentrification” that is making it difficult for both commercial and charter fishers to remain in their traditional place on land and water. Without a body of research built up over time and a continuing set of data to research, we are unable to develop hypotheses and test theories that will help us understand how these communities are able to respond to changing regulation, no less to the other factors mentioned already. Furthermore, there still remain important theoretical questions as to what constitutes a community that must be addressed. While NS8 specifies that a “fishing community” is land based and determined geographically, drawing those boundaries is still a difficult task and has yet to be outlined within the guidelines for analysis of fishing dependent communities. Once those boundaries have been determined then the complicated task of determining fishing dependence must also be accomplished. Furthermore, there is evidence that fishers often consider their community to be virtual and based on their particular gear type or fishery.

Overall, there remains considerable work to be done regarding the identification of fishing communities and their dependence on fishing. This will entail a concerted effort by both the NMFS and the regional councils. Hiring adequate staff and providing for the continued collection of relevant data are imperative for quality social impact assessment; the needs for which have become even more evident with the tragic events of Hurricanes Katrina and Rita. Such dramatic meteorological events and the likelihood of their persistence demonstrate the need to be able to document how coastal communities adapt and change under such rapid and widespread damage to their infrastructure and

the more predictable change that may come from regulatory agencies and the process of fishery management.

## NOTES

*Acknowledgments.* We would like to thank the Marine Resource and Assessment Group Americas, Inc. of Tampa Florida for providing the funding that was the basis for this research through their contract with the Gulf of Mexico Fishery Management Council. The present authors are responsible for data and interpretations. Address all correspondence to Michael Jepson, Ph.D. Gulf and South Atlantic Fisheries Foundation, Lincoln Center, Suite 740, 5400 W. Kennedy Blvd., Tampa, Florida 33609.

1. An interesting note is that the vulnerability index was coincidentally developed with a sensitivity index for habitat included in the document. With improved data collection, future analysis might incorporate the impact on various habitats fishers utilize with the well-being of their community.

2. Some communities included in the analysis are not visible in Figure 2 because some of the symbols overlap as a result of the map scale.

## REFERENCES CITED

- Freudenberg, William R.  
1986 Social Impact Assessment. *Annual Review of Sociology* 12:451–478.
- Gulf of Mexico Fishery Management Council  
2004 Draft Final Environmental Impact Statement for the Generic Essential Fish Habitat Amendment. Gulf of Mexico Fishery Management Council, Tampa, Florida.  
2005 Amendment Number 13 to the Fishery Management Plan For the Shrimp Fishery of the Gulf of Mexico, U.S. Waters with Environmental Assessment Regulatory Impact Review, and Regulatory Flexibility Act Analysis. Gulf of Mexico Fishery Management Council, Tampa, Florida.
- Gale, Richard P.  
1991 Gentrification of America's Coasts: Impacts of the Growth Machine on Commercial Fishermen. *Society and Natural Resources* 4:103–121.
- Hall-Arber, Madeleine, Chris Dyer, John Poggie, James McNally, and Renee Gagne  
2001 New England's Fishing Communities. A Final Report to the National Marine Fisheries Service, MARFIN grant #NA87FF0547.
- Holland, Stephen M., Anthony J. Fedler, and J. Walter Milon  
1999 The Operations and Economics of the Charter and Head Boat Fleets of the Eastern Gulf of Mexico and South Atlantic Coasts. A Report for NMFS, MARFIN grant no. NA77FF0553.
- Impact Assessment, Inc.  
1991 Community Profiles Developed for the Social Impact Assessment of the Inshore/Offshore Amendment Proposal. Anchorage: North Pacific Fishery Management Council, Anchorage.
- Jacob, Steve, Michael Jepson, Carlton Pomeroy, David Mulkey, Charles Adams, and Suzanna Smith  
2002 Identifying Fishing Dependent Communities: Development and Confirmation of a Protocol. A MARFIN Project and Report to the NMFS Southeast Fisheries Science Center.
- Johnson Jeffery C., and Michael K. Orbach  
1996 Effort Management in North Carolina Fisheries: a Total Systems Approach. North Carolina Sea Grant College Program, UNC-SG-96-08.
- Lucas, Linda E.  
N.d. Madeira Beach, Florida and the Grouper Fishery in the Gulf of Mexico: Landings, Value and Impacts of a One and Two-Month Closure. Unpublished MS, Eckerd College.
- Maril, R. Lee  
1995 The Bay Shrimpers of Texas: Rural Fishermen in a Global Economy. Lawrence: University Press of Kansas.  
1983 Texas Shrimpers. College Station: Texas A and M University Press.

- McCay, Bonnie J., and Marie Cieri  
2000 Fishing Ports of the Mid-Atlantic: Report to the Mid-Atlantic Fishery Management Council, Dover, Delaware, April 2000. Department of Human Ecology, Rutgers University, New Brunswick, NJ.
- McCay, Bonnie J., Johnelle Lamarque, Eleanor Bochenek, Teresa Johnson, Brent Stoffle, and Douglas Wilson  
2002 Social Impact Assessment for Amendment 13, Surfclam and Ocean Quahog Fishery Management Plan: A Report to the Mid-Atlantic Fishery Management Council, Dover, Delaware, January 2002. Department of Human Ecology, Cook College, Rutgers University, New Brunswick, NJ.
- Smith, Suzanna, Steve Jacob, Charles Adams, Glenn Israel, Garrett Evans, Jamie Gates, and Michelle Zacks  
2000 The Impacts of the Florida Net Ban on Commercial Fishing Families. Florida Sea Grant College Program, Technical Paper 101. Gainesville: University of Florida.
- Sutton, Stephen G., Robert Dittton, John R. Stoll, and J. Walter Milon  
1999 A Cross-sectional Study and Longitudinal Perspective on the Social and Economic Characteristics of the Charter and Party Boat Fishing Industry of Alabama, Mississippi, Louisiana and Texas. Report no. HD-612, Human Dimensions of Recreational Fisheries Research Laboratory, Texas A and M University.
- Wilson, Douglas, and Bonnie McCay  
1998 Social and Cultural Impact Assessment of the Highly Migratory Species Management Plan and the Amendment to the Atlantic Billfish Management Plan. Prepared for the Highly Migratory Species Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, the Ecopolicy Center, Rutgers University, New Brunswick, NJ.